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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,588	04/01/2004	Satoru Hosono	Q80867	5865

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EXAMINER	
UHLENHAKE, JASON S	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/814,588	HOSONO, SATORU	
	Examiner	Art Unit	
	Jason Uhlenhake	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Sayama (U.S. Pat. 6,419,337).

Sayama discloses:

- ***regarding claims 1, 9,*** a liquid ejection apparatus comprising: a liquid ejection head comprising: a nozzle orifice communicated with a pressure chamber and a pressure generating element which generates pressure fluctuation in liquid which is contained in the pressure chamber (Column 2, Lines 27-31); a drive signal generator, which generates a drive signal containing within one cycle (Column 2, Lines 33-39)

- first drive subsignal containing a plurality of first drive pulses each of which drives the pressure generating element to generate the pressure fluctuation so as to eject the liquid form the nozzle orifice (Abstract, Column 2, Lines 57-65), and a second drive pulse which drives the pressure generating element to generate the pressure fluctuation so as not to eject the liquid from the nozzle orifice (Column 3, Lines 10-17; Column 13, Lines 24-44); at least one second drive subsignal (series of drive signals), containing only the first drive pulses (Abstract, Column 2, Lines 57-65; Column 13, Lines 24-29)

- pulse supplier, which selectively supplies at least one of the first drive pulses and the second drive pulse to the pressure generating element in accordance with an amount of the liquid to be ejected from the nozzle orifice (Column 2, Lines 40-48)

- wherein each of the first drive subsignal and the second drive subsignal is associated with a first minimum area subjected to the liquid ejection; and wherein the second drive subsignal is associated with a second minimum area subjected to the liquid ejection, which is different from the first minimum area (Column 2, Line 57 – Column 3, Line 6), the drive signals can eject various sized drops which have different minimum areas

- ***regarding claim 2,*** wherein all of the first drive pulses have an identical waveform (Figure 4; Abstract, Column 57-65)

- ***regarding claim 3,*** the second drive subsignal is arranged at the beginning of the one cycle of the drive signal (Figure 4; Column 3, Lines 10-19; Column 13, Lines 24-44), the second drive subsignal can be at the beginning of the cycle since the vibration pulse can be selectively applied to the pressure generating element by the pulse supplier

- ***regarding claim 4,*** each of the first drive pulses and the second pulse is designated by one of pulse selection data processed in the pulse supplier; and the number of the pulse selection data for the first drive subsignal and the number of the pulse selection data for the second drive subsignal are the same (Figure 4; Column 2, . Lines 32-49)

- a predetermined potential of the second drive subsignal is supplied to the pressure generating element by one of the pulse selection data for the second drive subsignal (Column 2, Lines 40-49)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sayama (U.S. Pat. 6,419,337) in view of Kobayashi (U.S. Pat. 6,679,586).

Sayama discloses:

- ***regarding claim 5,*** duration of the one cycle of the drive signal is less than an interval (T) of the first timing signals (Figure 4)

- ***regarding claim 6,*** duration of each of the first drive subsignal and the second drive subsignal is less than an interval (T) of the second timing signals (Figure 4)

- minimum areas is repetitively defined in accordance with a series of second timing signals which are generated in the external of the drive signal generator (Column 2, Line 57 – Column 3, Line 6)

Sayama does not expressly disclose:

- ***regarding claim 5,*** drive signal is repetitively generated in accordance with a series of first timing signals which are generated in the external of the drive signal generator

Kobayashi et al discloses:

- ***regarding claim 5,*** drive signal is repetitively generated in accordance with a series of first timing signals which are generated in the external of the drive signal generator (Column 2, Lines 33 – 46; Claim 1), for the purpose of maintaining proper ink ejection without stopping printing operation.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of drive signal is repetitively generated in accordance with a series of first timing signals which are generated in the external of the drive signal generator as taught by Kobayashi et al into the device of Sayama, for the purpose of maintaining proper ink ejection without stopping printing operation.

Claim 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sayama (U.S. Pat. 6,419,337) in view of Hosono (U.S. Pat. 6,984, 010).

Sayama discloses all of the claimed limitations except for the following:

- ***regarding claim 7,*** the first drive pulses include a pair of first ejection pulses each for ejecting a liquid droplet having a first volume, and a second ejection pulse generated between the first ejection pulses for ejecting a liquid droplet having a second volume less than the first volume.

- ***regarding claim 8,*** the first drive pulses are generated at a fixed interval each for ejecting a liquid droplet having a fixed volume

Hosono discloses:

- ***regarding claim 7,*** the first drive pulses include a pair of first ejection pulses each for ejecting a liquid droplet having a first volume, and a second ejection pulse generated between the first ejection pulses for ejecting a liquid droplet having a second volume less than the first volume (Column 5, Lines 30 – 35), for the purpose of optimizing the ejection characteristics of the ink droplets.

- ***regarding claim 8,*** the first drive pulses are generated at a fixed interval each for ejecting a liquid droplet having a fixed volume (Column 3, Lines 31 – 36), for the purpose of optimizing the ejection characteristics of the ink droplets.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of the first drive pulses include a pair of first ejection pulses each for ejecting a liquid droplet having a first volume, and a second ejection pulse generated between the first ejection pulses for ejecting a liquid droplet having a second volume less than the first volume; the first drive pulses are generated at a fixed interval each for ejecting a liquid droplet having a fixed volume as taught by Hosono into the device of Sayama, for the purpose of optimizing the ejection characteristics of the ink droplets.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Uhlenhake whose telephone number is (571) 272-5916. The examiner can normally be reached on Monday - Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JSU
November 21, 2006

STEPHEN MEIER
SUPERVISORY PATENT EXAMINER